DOCUMENT RESUME

ED 215 446 EC 142 105

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TITLE The Special Education Student: His Behavior and Academic Achievement.
PUB DATE Aug 81
NOTE 17p.; Paper presented at the Annual Meeting of the American Psychological Association (Los Angeles, CA, August, 1981). Print is poor in parts.
AVAILABLE FROM Universite Laval, Tour des Arts; Quebec, Canada.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; Behavior Patterns; Junior High Schools; *Learning Disabilities; Males; *Prediction

ABSTRACT

The relationship between classroom behavior and academic success was investigated in 29 seventh grade boys with learning difficulties. Observations were made of 19 categories of behavior, including approval in group, appropriate visual orientation in class, class interaction, group work, inappropriate peer interaction, and teacher contact. Results confirmed that academic achievement was related to classroom behavior, although the predictiveness of behavioral categories was not stable across experimental phases. Five behaviors were among the best achievement predictors: attention, participation (verbal and nonverbal), initiating teacher contacts, appropriate disapproval, and classroom approval. Ordering and notetaking behaviors showed a negative relationship to academic achievement. (CL)

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# THE SPECIAL EDUCATION STUDENT: HIS BEHAVIOR AND ACADEMIC ACHIEVEMENT.

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Summary

The present study set out to test the relationship between classroom behavior and academic success among seventh-grade boys with learning difficulties. Unique features of the study included the type of students used, the observation instrument and process, the number of observations collected and the use of repeated measures across three experimental phases. Observations were collected on twenty nine boys during their French and Mathematics classes. Academic achievement, as measured by students' report cards, was the dependent variable and 19 categories of behavior served as the independent variables. The ability of behavioral categories to predict academic achievement was tested with Dixon's (1975) BMD-02R program. Observer reliability was 83 percent.

Conclusive results were presented confirming the relationship between several classroom behaviors and academic success. For the six regression analyses that were performed, R indexes ranged from .51 to .91, attaining the .05 level of significance, for five of the equations. Predictive equations were not stable across experimental phases and this phenomenon is discussed. This correlational study puts salient behaviors into perspective and offered explanations for the instability of behavioral predictiveness.

EC142105

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# THE SPECIAL EDUCATION STUDENT: HIS BEHAVIOR AND ACADEMIC ACHIEVEMENT.

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Numerous studies have demonstrated that behavioral problems can affect academic learning and that treatment of behavioral components can help ameliorate academic performance (Cartledge and Milburn, 1978). Study of the links between students' classroom behavior and their academic performance has been carried out in order to appropriately orient intervention programs. Existing research (Cobb, note 1, 1972; Lahaderne, 1968; Perkins, 1965; McKinney, Mason, Perkerson and Clifford, 1975; Loranger, 1977) has shown that measures of attention and inattention, respectively, show direct and inverse relationships with academic performance. These studies have also shown that several behaviors are specifically related to academic performance, such as following teacher instructions, voluntary participation, appropriate interaction with peers and placement in appropriate locations. These studies were carried out mostly at the elementary school level. Many differences can also be noted in these studies, pertaining to their methods of data collection and strategies for the control of observer bias, when systematic observation has been used. These studies also differ in terms of the types of coding systems used and the number of observations collected for each student. These differences justify continued research

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This research was partially supported by a grant from the Minister of Education of Quebec, D.G.D.P., projects 77-05 and 80-13.

in this area, in order to improve our knowledge of this interactional phenomenon called the learning process.

The present study was aimed at studying the relationship between classroom behaviors and academic achievement among seventh grade students with learning difficulties, from within a French-speaking milieu. The study took into account Cobb's, (1972) suggestions concerning an increase in the number of observations per student, redefined the coding system in light of existing research on this topic, and used strategies which minimized observer bias. This study also improved upon existing research by performing the same analyses at three successive phases during the academic year, permitting determination of the stability of the results obtained.

## Method

### Subjects

29 boys, ages 12 to 14, presenting reading and writing problems in French and low achievement in Mathematics were included in the study. Subjects' intellectual ability permitted them to pursue secondary school studies. These students also exhibited a higher than average degree of behavior considered inappropriate within the school setting. All subjects received instruction from and were graded by the same two teachers in French and Mathematics.

### Experimental Design

Behavioral data was collected by systematic observation at three successive phases of the academic school year, corresponding to the first

three school marking periods. Thus, three repeated mesures were collected on the same subjects.

Systematic observations

The coding system (Note 2) was based upon that of Cobb and Hops (Note 3) and further revised after its first use (Loranger, 1977). Observations were collected on the following 19 behavioral categories. Students

Insert Table 1 here

were systematically observed during 12 classroom sessions for each subject - area (French and Mathematics) and experimental phase, totaling 72 sessions (52 minutes each) per student. The mean number of observations per student, per subject was 575.

Observations were made from behind one-way mirrors in observation rooms attached to both classrooms. The six observers worked in pairs that were varied systematically from one observation session to the next by changing the members of each observer pair, the hours of observation and the subject-area observed. A screen was placed between observers during observation collection. These precautions attenuated the possibilities for bias during the measurement process (Johnson and Bolstad, 1973; Romanczyk, Kent, Diament and O'Leary, 1973). This method also allowed calculation of observer reliability.

Observer training

Observers received a three-phase training program. First, they studied a training manual (Loranger, Picard and Pomerleau, Note 2) to learn the 19 behavioral categories. Secondly, they viewed videotapes (Loranger, 1977) learning how to apply the behavioral criteria for each category. Finally, the observers received in vivo practice. At phases one and two observers attained a 95% or better agreement on prototype ratings. At phase three observer agreement was 80% or better for all observations.

Academic achievement

Students' academic achievement was defined in this study as the total number of academic points received by each student, considered separately for each subject-area and experimental phase. Achievement scores were assigned by the two teachers in French and Mathematics, without being aware of the study's purpose.

Statistical analysis

Reliability of observations was determined using the number of agreements divided by the total number of observations times 100. Multiple regression analyses at each experimental phase, using the program BMD-02R (Dixon, 1975), predicted the dependent variable (academic achievement) by use of the independent variables (frequency of appearance of the various behavioral categories).

## Results

### Reliability of observations

Table 2 presents reliability indexes for each behavioral category at each experimental phase and subject-area (French and Mathematics).

Insert Table 2 here

The global % of agreement obtained for all observations was 83.4%. Except for the percentage of agreement obtained for the first phase in French (78.7%), the global percentage of agreement for each phase and subject-area was better than 80%.

Table 3 presents the frequency of appearance for each behavioral category in each subject-area and phase.

Insert Table 3 here

Pearson correlation-coefficients, applied to the frequency of each behavioral category (Table 3) and reliability indexes (Table 2) for each subject-area and phase, attained the .05 level of significance, except for the first phase in French. This confirms the link between these two measures found by other researchers (Cobb, 1972; Loranger, 1977). The reliability maintained for each behavioral category is consistent with Johnson and Bolstad's (1973) criteria, in the respect that each category's reliability should be at least

significantly higher than that simply due to chance. The chi-square test was used to check for adherence to this criteria. Table 2 shows which categories did not meet this criteria and were, therefore, excluded from the subsequent prediction analyses. In effect, only categories with a 0% agreement were excluded by this procedure.

Prediction of academic achievement

Multiple regression analyses performed for each phase and subject-area presented in Table 4.

Insert Table 4 here

These analyses gradually selected the variables which best explain the variance of the dependent variable academic achievement, taking into account their inter-relationships. The final "R" values in Table 4 present this index of predictability for each phase and subject-area. The level of prediction in each case was significant at the .05 level, except for Mathematics at phase 3. The variance explained ($R^2$) in these analyses varied from 31% to 81% for categories attaining significance.

Categories in Table 4 that contributed .05 or more to the R index were retained to determine which categories contributed most to explication of variance in academic achievement. In Mathematics, the categories of group interaction (GI), verbal classroom interaction (CI), and approval in class (AC), because of their positive relationship to academic achievement,

contributed most to explication of the present results. The categories of teacher contact (TC), notetaking (CN) and inappropriate visual orientation (IOI) displayed a marked negative relationship to achievement in Mathematics.

In French, the most predictive behavioral categories having a positive relationship to academic achievement were: non-verbal participation (NVP), appropriate visual orientation (AOC) and appropriate disapproval behaviors (CGD). Those categories showing a significant negative relationship to achievement were: ordering behaviors (OB), disordering behaviors (DB) and notetaking (CN).

## Discussion

These results confirm the existence of a marked link between academic achievement and classroom behavior, and are generally more conclusive than those previously reported by other researchers. However, the predictiveness of behavioral categories was not stable across experimental phases. Prudence must, therefore, be exercised in using the present results for the formulation of intervention programs. This instability may in part be due to across-situations and time variations in pedagogical practices and academic achievement. However, results obtained in one subject-area and phase do not necessarily invalidate different results obtained for another phase in the same subject-area, even when the results are inconclusive, in the third phase of Mathematics, for example.

Instability in behavioral predictiveness can also be attributed in part to the statistical procedures used, which accent the most predicti-

ve categories, eliminating those whose predictiveness is already represented by the common variance explained by preceeding categories. A deeper analysis of the inter-relationships between categories could provide a more fundamental understanding of these predictive behaviors. The use of all behavioral categories in several predictive equations contributes to this understanding of achievement-behavior interactions.

The present study's results are generally consistent with results cited by other researchers. Attention and participation (verbal and non-verbal) behaviors have consistently shown a positive relationship to academic success. At the same time, the present study identified three more-specific, low-frequency behaviors that were among the best achievement predictors. These behaviors (initiating teacher contacts (TC); appropriate disapproval (CGD); and classroom approval (CA) demonstrate the importance of using a broad behavioral taxonomy, as suggested by Cobb (1972).

Some appropriate behaviors showed a negative relationship to academic achievement, such as initiating teacher contacts. This could be interpreted as showing that those who ask most for teacher assistance are those experiencing the most difficulties. Notetaking (CW) also showed a negative relationship to achievement. This result may indicate that the lower-achieving students are also those that take more time to write down the same amount of material or to finish the same amount of written work as other students. Finally, ordering behaviors (OB) also displayed a negative relationship to achievement. In the same direction as previc explanations, it may be that low-achieving students take more time than

others to manipulate and put away their school materials. Thus, considered one-at-a-time, the negative relationship between the above appropriate behaviors and academic achievement are not necessarily contradictory to expectation.

## Conclusion

The strength of the present results warrants continued investigation of the classroom behavior-academic achievement relationship. While generally consistent with previous research, interpretations were made in terms of the characteristics of the specific student population involved. In this regard, the present study offers some clues which may eventually lead to improvements in the educational intervention programs offered to this type of student.

TABLE 1

DEFINITION OF BEHAVIORAL CATEGORIES
INCLUDED IN OBSERVATION GRID

1. AC (approval in class) appropriate verbal/nonverbal expression of approval to another in class.
2. AG (approval in group) giving verbal/nonverbal approval to another student during group work.
3. AOC (appropriate visual-orientation in-class)
4. CGD (class-group disapproval) appropriate verbal/nonverbal expression of disapproval to teacher or peers.
5. CI (class interaction) appropriate academic interaction, verbal or nonverbal, with other students in class.
6. CN (class notetaking) during all academic work.
7. DB (disordering behavior) having negative impact on social or materiel classroom environment.
8. GI (group interaction) academic interaction with teacher or members of group.
9. GW (group work) individual work within a group project.
10. IIT (inappropriate interaction with teacher) verbal or nonverbal.
11. IOC (inappropriate visual-orientation in class).
12. IOI (inappropriate visual-orientation during individual work).
13. IPI (inappropriate peer interaction) verbal or nonverbal.
14. IW (individual work) of academic nature.
15. NVP (nonverbal participation) during class academic work.
16. OB (ordering behavior) behavior aimed at improving or maintening the class environment.
17. TC (teacher contact) appropriate verbal/nonverbal contact during individual work only.
18. UBG (uncooperative behaviors in group) including inappropriate visual-orientation.
19. VP (verbal participation) during class academic work.

TABLEAU 2

PERCENTAGE OF AGREEMENT FOR OBSERVATIONS ON 19 BEHAVIORAL CATEGORIES FOR THREE EXPERIMENTAL PHASES IN FRENCH AND MATHEMATICS

| Catégories | Periode 1 | | Periode 2 | | Periode 3 | |
|---|---|---|---|---|---|---|
| | Maths. | Fran. | Maths. | Fran. | Maths. | Fran. |
| GW | 72.9 | 38.9 | 85.7 | 86.9 | - | 87.1 |
| GI | 76.8 | 85.1 | 25.6 | 81.1 | 0* | 80.7 |
| AG | - | 0* | - | 0* | 0* | 0* |
| CI | 71.0 | 54.6 | 72.9 | 63.4 | 77.1 | 73.6 |
| AC | 35.3 | 26.7 | 47.1 | 54.6 | 56.4 | 16.7 |
| VP | 70.1 | 66.3 | 72.8 | 69.7 | 82.5 | 74.8 |
| NVP | 70.6 | 63.7 | 76.7 | 82.7 | 74.6 | 72.0 |
| AOC | 86.7 | 83.3 | 91.7 | 84.5 | 90.7 | 83.6 |
| CN | 72.3 | 78.7 | 74.6 | 80.5 | 85.5 | 89.3 |
| TC | 88.1 | 79.5 | 88.5 | 87.4 | 91.9 | 86.7 |
| IW | 94.7 | 93.8 | 95.7 | 95.0 | 95.1 | 94.5 |
| OB | 71.8 | 67.9 | 74.7 | 72.1 | 80.2 | 68.1 |
| CGD | 0* | 11.8 | 0* | 27.3 | 0* | 15.38 |
| DP | 61.9 | 58.9 | 68.9 | 64.1 | 69.5 | 70.4 |
| IIT | 33.3 | 44.8 | - | 48.6 | - | 57.6 |
| IPI | 58.5 | 61.1 | 47.5 | 63.6 | 62.8 | 69.9 |
| UBG | 50.0 | 0* | - | 87.5 | - | 60. |
| IOC | 51.6 | 57.9 | 62.8 | 52.7 | 61.1 | 61.1 |
| IOI | 68.5 | 70.2 | 72.1 | 72.5 | 75.6 | 78.7 |
| GLOBAL | 83.4 | 78.7 | 87.6 | 80.7 | 87,1 | 82.6 |

* Categories not meeting minimal rehability criteria.

TABLEAU 3

FREQUENCY OF APPEARANCE (%) FOR 19 BEHAVIORAL CATEGORIES AT 3 EXPERIMENTAL PHASES IN FRENCH AND MATHEMATICS

| Catégories | Phase 1 | | Phase 2 | | Phase 3 | |
|---|---|---|---|---|---|---|
| | Maths. | Fran. | Maths. | Fran. | Maths. | Fran. |
| GW | 3.29 | 0.2 | 0.05 | 1.13 | - | 2.60 |
| GT | 5.47 | 1.14 | 0.28 | 1.16 | 0.02 | 2.24 |
| AG | - | 0.005 | - | 0.02 | 0.01 | 0.01 |
| CI | 2.58 | 1.79 | 2.99 | 2.87 | 2.13 | 2.01 |
| AC | 0.09 | 0.08 | 0.24 | 0.35 | 0.47 | 0.08 |
| VP | 1.40 | 1.92 | 1.47 | 2.87 | 2.13 | 2.41 |
| NVP | 0.46 | 1.03 | 0.43 | 0.67 | 0.40 | 0.32 |
| AOC | 24.12 | 29.66 | 35.57 | 27.45 | 38.83 | 24.33 |
| CN | 2.75 | 5.76 | 3.12 | 5.10 | 5.97 | 13.59 |
| TC | 3.31 | 2.37 | 2.85 | 3.15 | 2.07 | 2.61 |
| IW | 38.22 | 27.59 | 37.03 | 28.32 | 28.91 | 22.68 |
| OB | 3.74 | 4.96 | 3.07 | 4.34 | 4.49 | 4.28 |
| CGD | 0.07 | 0.09 | 0.01 | 0.14 | 0.01 | 0.09 |
| DP | 3.65 | 6.08 | 3.97 | 6.69 | 4.55 | 5.45 |
| IIT | 0.03 | 0.33 | - | 0.48 | - | 0.43 |
| IPI | 2.30 | 5.16 | 0.57 | 5.54 | 1.04 | 4.83 |
| UBG | 0.19 | 0.02 | - | 0.10 | - | 0.20 |
| IOC | 3.87 | 6.85 | 4.50 | 5.50 | 5.27 | 6.06 |
| IOI | 4.43 | 4.95 | 3.85 | 4.12 | 3.70 | 5.79 |

TABLEAU 4

RESULTS OF MULTIPLE REGRESSION ANALYSES
FOR EACH PHASE AND SUBJECT.

| PHASE - SUBJECT | CATEGORIES | | | | | R = | F = |
|---|---|---|---|---|---|---|---|
| MATHEMATICS | GI | IP | CPV | | | | |
| | r 0.47 | -0.45 | 0.08 | | | dl (10,18) | |
| | R | 0.65 | 0.71 | | | 0.82 | 3.573** |
| FRENCH | CPNV | ORN | CN | CO | | dl ( 9,17) | |
| | r 0.41 | -0.34 | -0.14 | 0.41 | | | |
| | R | 0.62 | 0.68 | 0.74 | | 0.82 | 4.008** |
| MATHEMATICS | CPNV | CE | CN | CA | ION | dl (8,19) | |
| | r 0.35 | 0.31 | -0.35 | 0.06 | -0.18 | | |
| | R | 0.51 | 0.60 | 0.65 | 0.70 | 0.79 | 3.710** |
| FRENCH | CN | CGD | ORN | CPNV | OR | dl (14,12) | |
| | r -0.48 | 0.47 | -0.35 | 0.37 | -0.13 | | |
| | R | 0.69 | 0.76 | 0.81 | 0.84 | 0.91 | 4.405** |
| MATHEMATICS | CN | OR | | | | dl (11,15) | |
| | r -0.25 | 0.24 | | | | | |
| | R | 0.36 | | | | 0.51 | 0.476 |
| FRENCH | CN | OR | CO | | | dl (3,21) | |
| | r -0.36 | -0.32 | 0.18 | | | | |
| | R | 0.50 | 0.56 | | | 0.56 | 3.126* |

* $p < 0,05$

** $p < 0,01$

## NOTES

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